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mity of an axis, and the author proceeds to show how the latter attraction can be found and reduced to elliptic functions. He then gives this proposition :

Let  $a, b, c$  be the semiaxes of a homogeneous fluid ellipsoid, and A, B, C the forces acting on points at the extremities of  $a, b, c$ , caused partly by the ellipsoid's own attractions on its parts, and partly by centrifugal forces of revolution about an axis ( $2c$ ), or by the action of an extraneous force directed towards its centre, and varying as the distance from the centre, then the ellipsoid will preserve its form if  $Aa=Bb=Cc$ .

The last proposition stated in the paper is thus given : let R and  $r$  be the radii of two homogeneous concentric spheres ; A and  $a$  the attractions of each on a point on the surface of the other, then  $\frac{A}{R^2} = \frac{a}{r^2}$ , whatever be the law of attraction as a function of the distance.

The demonstration given of the first of these two theorems is very concise, and of the second is direct and elementary.

VI. "Researches on the Impregnation of the Ovum in the Amphibia; and on the Early Stages of Development of the Embryo." (Third Series.) From the MS. papers of the late GEORGE NEWPORT, F.R.S., F.L.S. &c. Selected and arranged by GEORGE Viner ELLIS, Esq., Professor of Anatomy in University College, London. Communicated by Sir JOHN FORBES, M.D., F.R.S. Received June 6th, 1854.

In this paper the author has given the result of further inquiries into the manner by which the frog's egg is impregnated, and has supplied in addition some very interesting facts respecting the development of the embryo during the earlier stages of its growth.

In consequence of the difficulties that arose in the course of the inquiry, and of the doubts that might be suggested by others from the difficulty of manipulating with the egg of the Amphibia unless certain precautions are taken, the author first describes the apparatus

used and the mode of proceeding he has employed; and his results show that he has successfully surmounted the obstacles to microscopic investigation caused by the opacity, the great size, and the tendency to movement inherent in the egg.

The fact of the impregnation of the ovum through the entrance of the spermatozoon into the yolk by its own movement was communicated to the Royal Society in a preceding paper\*, and the original experiments there referred to as serving to establish the fact, are now detailed. In addition, the circumstances affecting the passage of the sperm-body through the thick investing envelopes are considered, and thence it is concluded, that "when there is any deficiency in the usual power, arising from an unhealthy condition of the fertilising body, or an increase in the resistance of the yolk membranes, the spermatozoon is unable to pass through the membranes into the yolk and the egg remains unfertilized."

The two small rounded bodies that appear on the surface of the yolk in the interval or *chamber* between it and the investing membrane, have been traced from their origin, through their changes, till their disappearance after the equatorial division of the yolk. The investigations as to the true import of these bodies have not been further carried out, in consequence of the untimely death of the author; but his observations have induced him to put forth the following statement regarding them, viz. "that they are usually, and perhaps invariably, at that part of the yolk at which the head of the embryo is afterwards found."

By following the changes in the segmenting yolk, evidence has been obtained of the derivation of different parts of the future being from definite segments of the yolk. Thus it has been found, that the half of the yolk on one side of the second or crucial cleft begins its subdivisions sooner than the opposite, and that the trunk and tail of the embryo are derived from this first subdividing part, whilst the head is produced from the other half.

Having ascertained so much respecting the foundation of different parts of the embryo, the author next determined that the axis or spine will primarily lie in a line with the first cleft of the yolk, though it may afterwards deviate somewhat from that line during the growth of the embryo.

\* Philosophical Transactions for 1853, p. 271.

Lastly, it has been sought to discover what influence the artificial application of the spermatozoon to only one side of the egg would have upon the direction of the primary cleft of the yolk. The result of this inquiry seems, very curiously, to be, that the first cleft of the yolk will lie, under the circumstances stated, in a line with the point of the egg that has been touched with the impregnating fluid.

VII. "Contributions to the Anatomy of the Brachiopoda." By  
THOMAS H. HUXLEY, F.R.S. Received May 18, 1854.

In the course of the dissection of certain Brachiopoda with which I have recently been engaged, I have met with so many peculiarities which are unnoticed in the extant and received accounts of their anatomy, that although the pressure of other duties prevents me from attempting to work out the subject with any degree of completeness for the present, I yet gladly avail myself of the opportunity of communicating a few of the more important results at which I have arrived, in the hope that they may find a place in the Proceedings of the Royal Society.

My investigations were principally made upon *Rhynchonella psittacea*, for specimens of which I am indebted to Prof. Edward Forbes, while Dr. Gray obligingly enabled me to compare them with *Waldheimia flavescens* and with *Lingula*.

1. *The Alimentary Canal of Terebratulidæ*.—Professor Owen, in both his earlier and his later memoirs on the anatomy of the Terebratulidæ, describes at length the manner in which the intestine, as he states, terminates on the right side between the lobes of the mantle.

On the other hand, Mr. Hancock has declared himself unable to observe at this point any such anal aperture, and concludes from his own observations that the latter is situated on the ventral surface of the animal in the middle line, just behind the insertion of the great adductor muscle. M. Gratiolet, in a late communication to the Académie des Sciences, takes the same view. To get rid of the obvious difficulty, that this spot is covered by the shell, and therefore that if the anus existed here, there would be no road of escape for the faeces, Mr. Hancock and Mr. Woodward appear to be inclined